

NASA TECH BRIEF



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Axisymmetric Two-Phase Perfect Gas Performance Program

The problem:

To develop an axisymmetric method which calculates the performance of propellant systems having both gaseous and condensed exhaust products.

The solution:

A computer program which calculates the inviscid axisymmetric nozzle expansion of propellant systems having both gaseous and condensed exhaust products.

How it's done:

The program considers the velocity and thermal lags (for ten particle groups) between the gaseous and condensed combustion products (when they are present in the chamber). It does not consider mass transfer (only momentum and energy transfer) between gaseous and condensed combustion products, nor does it consider nonequilibrium effects of finite rate chemical reactions between gaseous and combustion products. This program considers only the expansion of a uniform mixture (the ideal engine case).

Standard explicit integration methods are used. The program is designed for engineering use and is

specified and programmed in a straightforward manner to facilitate its use as a development tool.

Notes:

1. This program is written in Fortran IV for use on the IBM 7094 computer.
2. This program will perform calculations for contoured nozzles as well as conical nozzles.
3. Related computer programs are described in NASA Tech Briefs 68-10375, 68-10376, and 68-10377.
4. Inquiries concerning this program may be made to:

COSMIC
Computer Center
University of Georgia
Athens, Georgia 30601
Reference: B68-10374

Patent status:

No patent action is contemplated by NASA.

Source: J. R. Kliegel and G. R. Nickerson
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